



**Massachusetts Bay
Transportation Authority**

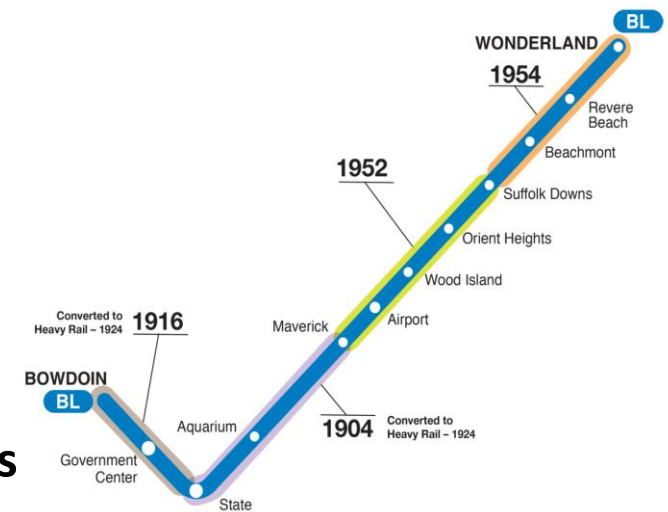
Blue Line Program

October 1, 2018



Blue Line Overview

- **Heavy Rail Service since 1924**
- **Tunnel Infrastructure from 1904**
- **Bowdoin to Wonderland**
 - Under Boston harbor
- **69,500 Daily Ridership**
- **~ 6 miles long**
- **Mixed power infrastructure**
 - Third rail and overhead Catenary
- **Vehicles 15 years old**
 - 72 Vehicles during peak service
 - Vehicle procurement in 10+ years
- **Only rail transit line with Logan Airport Access**





Previous Blue Line Program

- Executed between 1993 and 2016
- Maintenance Facility: New Car House at Orient Heights and Rebuild Yard
- Fleet: Increased train set from 4 cars to 6 cars
 - 94 Seimens Dual Powered (3rd Rail and Overhead Catenary)
 - Introduced from 2007 through 2009
- Infrastructure:
 - System-wide power upgrades to 3rd Rail and Catenary System
 - 2.5 Mile Track Upgrades
- Stations: Upgraded and Lengthened 11 station platforms
 - Reconstructed Orient Heights Station
 - Reconstructed Government Center



Orient Heights Car House



Blue Line Focus Areas

Problem Statement: Drive service reliability and improvement through infrastructure investment

- Service delays due to trip-stop (signal) reliability
- Reduced speed zone due to track condition in constrained corridor
- Susceptible to storm surge flooding
- Upgrade infrastructure with event recovery considered

Infrastructure

- State of Good Repair
- Water Mitigation
- Obsolescence
- Operational Efficiency
- Tunnel Structure
- Accessibility Improvements

Resiliency

- Storm Surge
- Catenary Removal
- Equipment protection/relocation
- Monitoring and Sensing

Capacity

- Service Capacity Improvement Study



Example Blue Line Issues



Leakage and corrosion at Maverick Platform



Corroded cables due to water at Maverick



Standing puddle of water at Maverick



Flooding at Aquarium Station

*3rd Rail + Overhead
Catenary Power*





Infrastructure Improvements

- **Currently executing**
 - Maverick to Aquarium Track and Tie replacement (most Critical only)
 - » 3000 ft. of rail to remove worn and jointed rails plus tie work – Results will improve travel time by 2 minutes
 - Platform Inspections – 100% complete
- **Planned efforts**
 - Blue Line Signal Study
 - » Mechanical Trip Stop replacement
 - » Electronics obsolescence
 - » Maneuverability improvements
 - Long Wharf Vent Shaft and Egress Rebuild
 - Maverick to Aquarium Infrastructure Assessment
 - Elevator Program - Wood Island and Beachmont
- **Future program elements**
 - Capacity Improvement Study
 - Suffolk Downs Facility Rehabilitation
 - Power
 - » Infrastructure Upgrades
 - » Traction Power Conversion to all 3rd Rail
 - Signal Upgrade
 - Tunnel Repairs
 - Parking facilities
 - Ongoing Track Work



Mechanical Trip Stop in the "stop" position



Resiliency Improvements

- **Underway By Environmental Department**
 - Aquarium Station to Maverick Portal Flood Resiliency Study
 - » Assessing/mapping all of the entry points for water (on going as well as for extreme storms)
 - » Aquarium Station Headhouse (affecting elevator & escalator)
 - » Long Wharf vent shafts & emergency egress structure
 - » Groundwater infiltration in tunnels
 - » Infiltration at areas above the walls
 - » Also assessing pumps, piping and other conduits
 - Orient Heights Maintenance Facility Resiliency Study
 - » Identifying areas of facility that may flood during extreme storms over the next 25 years
 - » Inventorying those critical assets that should be raised/elevated to protect against flooding (*e.g.*, transformers, electrical equipment, power feeds, *etc.*)
 - » Identify areas where vehicles can be relocated to during extreme storms



Resiliency Improvements

- **Future Needs**
 - Complete analysis is needed to determine best approach for mitigation
 - » Orient Heights to Beachmont Flooding issues
 - » Critical equipment assessment -> relocation, elevation or protection
 - » Investment in remote monitoring and sensing systems
 - Replace catenary with third rail to prevent extreme wind damage
 - Relocate critical equipment (power, signals, etc.) out of areas that are expected to experience increased flooding



Next Steps

- Signal Technology Study: Procurement underway
- Capacity Improvement Study: Scope Under Development
- Procure Designer for Maverick to Aquarium Infrastructure (Track, Signals, Power, Tunnel, Drainage, etc.): In CIP
- Complete Environmental Flood Resiliency Study: Study Underway
- Develop program funding needs

